able to obtain annually sufficient funds to keep the laboratory in efficient working order when once the capital sum of 10,000*l.* has been subscribed. Towards the latter amount they have already raised a sum exceeding 5000*l.* From Plymouth as a centre, in the course of future years, the operations of the Association will extend, and additional laboratories will no doubt be constructed hereafter by the Association on other parts of the coast of the United Kingdom, should the first one prove a success, and the work carried out through its agency meet with public approval and support.

Whilst the Marine Biological Association aims at obtaining, by the operations of its laboratory and experimental aquarium, that knowledge which is clearly necessary for the improvement and regulation of our sea fisheries, it must be remembered that its work will necessarily enlarge and advance the great science of biology, and that to many of us this is its surest promise of utility, for we cannot always directly govern the march of scientific progress. The whole field of knowledge must be cultivated, in the simple faith that the increase of knowledge is the greatest good which human effort can achieve. By adopting a thorough and comprehensive scheme of study of the problems connected with the life of fishes, we shall, as invariably happens in the history of science, obtain results which at present we cannot foresee, but which, we may feel assured, will yield in unexpected ways rewards and blessings to humanity.

METEOROLOGICAL INSTRUMENTS

THE Royal Meteorological Society recently held its sixth Annual Exhibition of Instruments at the Institution of Civil Engineers, 25, Great George Street, S.W. This Exhibition was devoted to sunshine recorders, and solar and terrestrial radiation instruments.

The first attempt at obtaining an instrumental record of the amount of sunshine was made by Mr. J. F. Campbell, of Islay, in the year 1853, when he mounted a hollow glass sphere filled with acidulated water, in the centre of a cup of mahogany, so arranged that the sun's rays were focussed on the interior of the cup and burned it. The lines of burning, therefore, indicated the existence of sunshine. Solid glass spheres have been substituted for the hollow ones, and cards in metal frames have replaced the wood; but in its principle the sunshine recorder of 1885 differs little from that erected on Richmond Terrace, Whitehall, thirty years ago. Other modes of recording sunshine are based on the action of the rays of the other end of the spectrum on the actinic instead of the heat rays. Among workers in this direction may be mentioned Marchand of Fécamp, Sir Henry Roscoe, and others. The most recent improvements in this direction are those by Prof. McLeod and by Mr. Jordan.

With regard to solar radiation thermometers, the successive stages in the assumed perfecting of these instruments have been as follows:—An ordinary mercurial thermometer acts as a spherical mirror, and reflects the rays which fall upon it. To lessen this the bulbs were first made with black glass; moreover, originally the degree marks were put upon the supporting slab, then they were put upon the tubes of the thermometers. It was then found that in a position where two thermometers with similarly coated bulbs were exposed to the sun, but one was exposed to more wind than the other, the indicated temperatures varied greatly. To avoid this it was proposed that the thermometer should be inserted in a glass shield exhausted of air. Various forms of mounting have been adopted, but the chief efforts have been expended in determining the influence of the amount of air left in the so-called vacuum. The next stage was that, inasmuch as black glass had a bright surface, there was still much light reflected, and therefore the surface was dulled with a coat of lamp-black—so that all heat falling upon the bulb might be absorbed. Subsequently, owing to the influence of the lower temperature of the unblackened thermometer tube, about one inch of it was coated like the bulb. As evidence of the degree of exhaustion, a small mercurial pressure gauge was attached to the thermometer, and by other makers platinum wires were soldered through the shield so that the stratification of the electric arc might indicate the amount of air still left.

With regard to terrestrial radiation thermometers, the pattern of instrument used has varied very little. The Rutherford minimum has almost always been used, but its sensitiveness has gradually been increased: the spherical bulb was replaced by a cylinder, the cylinder was elongated and bifurcated, and eventually, in order to strengthen the forks, they were united into what is known as a "link." Another plan was to flatten the cylindrical bulb into as thin a plate as possible, this giving a maximum of surface in proportion to the contents. The bulb was also made double, and thus we have the so-called "bottle" pattern, and then the tube was let into the side of the bottle, and both ends of the bottle were left open, and so we have the "open cylinder"—a remarkable specimen of glass-blowing. Then there have been two patterns of mercurial thermometers—Casella's and Negretti's. Difficulties have arisen from the degree marks being obliterated by the weather. To guard against this the tube has been inclosed in what are known as Leach's shields, and many attempts have been made to render the joint at the entrance of the tube watertight. This is not easy, because the thermometer is exposed to a great range of temperature, and the air inside the shield varies so much in volume that it forces its way through almost every joint. The object is, however, effected when the external jacket is sealed on the stem near the bulb.

In addition to specimens illustrating the various patterns of the above instruments, the Exhibition also included a number of new instruments, and many interesting photographs, sketches and diagrams. The photographs of clouds and lightning were very good.

At the meeting of the Society the President, Mr. R. H. Scott, F.R.S., read a paper giving a brief account of the various instruments and arrangements to be found in the Exhibition for the purposes of recording solar and terrestrial radiation and the duration of sunshine both in regard of its light and its heat, the last-named being obtained by means of the sunshine recorders, which are now pretty generally used. He exhibited twelve monthly maps showing the percentage proportion of hours of recorded sunshine to the hours the sun was above the horizon in the various districts of the United Kingdom. He stated that the features which strike any one on examining the maps of sunshine, which are for the most part for the five last summers and for the four last winters, excluding January to March, 1885, which has not yet expired, are:—First, the broad fact that the extreme south-western and southern stations are the sunniest, as has already frequently been pointed out. Jersey is undoubtedly the most favoured of our stations in this particular. Second, that in the late autumn and winter Ireland is much sunnier than Great Britain, Dublin having absolutely the highest percentage of possible duration of sunshine in November and December, and being only equalled by Jersey in January. The Dublin instrument is not situated in the city, but at the Mountjoy Barracks in the Phœnix Park, beyond the Vice-regal Lodge. The north-east of Scotland is also exceptionally bright, as the station, Aberdeen, lies to leeward of the Grampians. In April the line of 40 per cent. of possible duration takes in Jersey, Cornwall, Pembrokeshire, the Isle of Man, and the whole of Ireland except Armagh. The absolute maximum of the year occurs in May, and the amount rises to 50 per cent. (nearly to 60 in Jersey) over the district just mentioned as enjoying 40 per cent. in April. In June there is a falling off, which is continued into July and even into August in the Western Highlands. In the South of England, however, a second maximum occurs in August, the figure for Jersey rising to 50 per cent. This is mainly due to the exceptionally bright weather of August, 1884, in the southern counties of England. In September, Ireland shows a falling off, and the greatest degree of cloudiness is in Lincolnshire. In October, the Midland Counties of England are the worst off. In November the line of 40 per cent. encloses two districts, one Dublin, already mentioned; the other the Eastern Counties (Cambridge and Beccles). The absolutely highest monthly percentages in the period under consideration are in the month of May, 1882, in which St. Anne's Head, Milford Haven, had 62 per cent., while Geldeston (Beccles), Douglas (Isle of Man), and Southbourne (Bournemouth) show 61 per cent.

SCIENTIFIC SERIALS

THE *American Journal of Science*, April.—On the use of carbon bisulphide in prisms, being an account of experiments made by the late Dr. Henry Draper of New York. The results so far obtained by Dr. Draper in his investigations on the cause of the difficulties encountered in the use of carbon bisulphide in prisms seemed so valuable and so likely to prove useful to others engaged in photographing the prismatic spectrum that it was decided to publish them in the *American Journal of Science.*

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With the assistance of Mrs. Draper, Mr. George F. Barker was accordingly requested to collect from Dr. Draper's copious notes the facts here detailed in connection with his experiments. Some supplementary measurements have also been made to test the efficiency of the apparatus.—The genus Pyrgulifera, Meek, and its associates and congeners, by Charles A. White. These molluscan forms, constituting the Bear River Laramic fauna of the author, are not found among any other North American fauna, either fossil or recent, but appear to have their congeners in a fauna still surviving in Lake Tanganyika, Central Africa, as well as in the Upper Cretaceous fresh-water deposits of Hungary.—On the occurrence of native mercury in the alluvium in Louisiana, by Ernest Wilkinson. Native mercury has recently been unexpectedly discovered at Cedar Grove Plantation, Jefferson Parish, Louisiana, where it is found disseminated in small globules in the mean proportion of 0·002934 per cent. throughout the alluvial soil. It also occurs elsewhere in the same region in such large quantities and under such general conditions that its presence can hardly be attributed to human agency. Yet no other explanation is offered of this curious phenomenon.—Remarks on the series of earthquakes that have recently devastated the southern provinces of Spain, by C. G. Rockwood, jun.—On the structure of the spores or spore-like bodies (*Sporangites huronensis* of Sir J. W. Dawson) occurring in the Devonian formations of North America, by J. M. Clarke.—Denudation of the two Americas, by T. Mellard Reade. In this paper the author follows up the calculations already made by him regarding the quantity of matter annually removed in river water from the surface in England and Wales and some of the river basins of the European continent. Here the Mississippi, Amazons, and St. Lawrence basins are dealt with, the results confirming the provisional assumption that about 100 tons of rocky matter are dissolved by rain per English square mile per annum throughout the world.—On Arctic Interglacial Periods, by Dr. James Croll. It is argued that the Polar Interglacial periods were more marked than the Glacial, and that they neither did nor could exist *simultaneously* in both hemispheres. In a concluding note the author remarks that this will probably be his last paper on questions relating to geological climate, advancing years and declining health obliging him to abandon the subject in order to finish some work in a different field of inquiry which has been laid aside for over a quarter of a century.—Notes on some apparently undescribed forms of fresh-water Infusoria, No. 2 (with Plate III.), by Dr. Alfred C. Stokes.—Palæozoic notes; new genus of Cambrian Trilobites Mesonacis, by Charles D. Walcott.

Bulletin de la Société d'Anthropologie de Paris, 4e Fascicule, 1884.—The sequel to the "Anthropology of California," by M. Ten Kate.—Observations on the anthropological character and social conditions of the M'zabites, by Dr. Charles Amat, who has added to the results of his personal study of the people a brief summary of their history, derived from the chronicle of Abou Zakaria, translated by M. Masqueray, while he is indebted to a brother officer, M. Motylinsky, for much interesting information regarding the language, which differs entirely from Arabic, and presents close affinities with the dialects of the Berbers. The people, who are a remnant of the ancient sect of the Karidjites, retain many traces of pre-Moslem usages and forms of belief, follow agricultural pursuits, and are the main purveyors of corn in the Sahara.—Notes, by Dr. Hyades, on the Fuegians, considered from a hygienic and medical point of view.—On the significance of the name of the Aryans, by M. Ploix, who attempts to prove its derivation from a Sanscrit root indicating "white." This hypothesis is very forcibly attacked by M. O. Beauregard, who, in a subsequent communication to the Society, brings forward strong evidence to show that the etymological meaning of the term is "noble" or "venerable."—A report on the project of instituting an official anthropometrical examination of the pupils in the primary schools of Paris, by M. Manouvrier.—On the influence of the American medium on the races of the Old World, by M. de Quatrefages.—Notes by M. Pietrement in support of his opinions regarding the age of iron, which had been called in question by M. Mortillet.—Communication, by M. de Rialle, of M. Macey's account of a grave, discovered near Saïgon, Cochin China, in 1882. According to the opinion of the few natives who are versed in local archæology, this grave, which was discovered twelve feet below the surface, dates back at least 400 years. From the lower of the two superposed coffins, besides a few vertebræ and the tibiæ, a cranium was extracted which presents a deep perforation above the right temporal that may be regarded as the cause of the death of the Annamite chief to whom the remains belonged.—Report, by M. de Ujfalvy, of the finds obtained from a Celtic cemetery near Rosegg, in the valley of the Drave. The tumuli, of which there are more than 300, resemble in structure and general contents those opened at Hallstadt and in Styria, but in addition they have yielded a large number of curious little leaden figures of wheels, birds, men on horses, &c., attached to the surface or margins of the various vases.—On some crania from the Merovingian graves at Fermes (Oise), by M. de Maricourt, with an extensive series of measurements, which, according to him, afford strong presumptive evidence of diseases having a scrofulous or syphilitic origin.—On the Gallic rock-tumuli of Port Bara (Quiberon), by M. Gaillard.—On an elephant's tusk found in the valley of the Drance (H. Savoie), by M. D'Acy. This find was obtained at 3000 feet above the level of the sea, and is believed to belong to a relatively recent representative of *Elephas primigenius*.—On the manufacture of fire-flints still existing in France, by M. P. Salmon. This industry is chiefly carried on near Percheriou (Loir-et-Cher), whence large numbers of flints are annually exported to supply the demand still existing for them among Central African and other savage tribes.—Communication, by Dr. Verrier, regarding the work of Dr. Engelmann, of Louisville, on the various modes of delivery prevalent amongst women of different races.—On the different powers of resisting cold shown by various races, by M. Maurel.—On a placental anomaly in a case of twin-delivery, by Dr. Verrier.—Notes on the crania of three idiots, by Drs. Doutrebente and Manouvrier.—Observations on the static and dynamic conditions by which man is enabled to stand erect, by Dr. Fauvelle.—Researches on the so-called "Maye" of Provence, by Dr. Berenger-Ferand. The paper is an enlarged exposition of an earlier notice, which appeared in 1883, on the Provenzal customs of our own times, in which the author sees a survival of the ancient worship of Maia—as are our own May queen, Florrie games, jack in the green, and other May festivals—the long ages of Christianity having modified but not obliterated the traces of paganism.

Rendiconti del Reale Istituto Lombardo, March 12.—Note on the kinetic theory of the gases and on the limits of the terrestrial atmosphere, by Prof. R. Ferrini.—On some geometrical, statical, and kinematic properties of articulated polygons, by Prof. G. Jung.—A comparison of the respective merits of Bellani's lucimeter and the English heliograph constructed by Negretti and Zambra, of London, by Giovanni Cantoni.—On some uniform representations in the higher mathematical analysis, by Prof. Giulio Ascoli.—On some remarkable features of the stratified rocks in the Valtravaglia district, North Lombardy, by Prof. Taramelli.—On the question whether rice should be considered as a contraband of war, by Ercole Vidari.

April 9.—Historical notes on the comet of the year 1472, by Prof. G. Celoria.—On the geometrical movement of invariable systems, by Prof. C. Formenti.—Remarks on the cholera bacilli observed and described by Pacini in his various medical publications, by Prof. L. Maggi.—Further observations on uniform representations, by Prof. Giulio Ascoli.—Note on the traces of Roman jurisprudence in the Longobard edicts, by Prof. P. del Giudice.—Critical examination of the proposed Italian penal code punishments, by E. A. Buccellati.

Bulletin de l'Académie Royale de Belgique, March 7.—A word on the two Balenopteræ cast ashore at Ostend in the years 1827 and 1885, by P. J. Van Beneden.—Observations of Wolf's comet made at the Brussels Observatory (0·15 m. equatorial), by L. Niesten.—Observations of Encke's comet made at the same observatory, by E. Stuyvaert.—On the early epochs of Flemish history, by Alphonse Wauters.—Note on Louis du Tielt, painter and engraver, who flourished at Ypres during the seventeenth century, by Ch. Piot.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, January 22.—"Observations on the Chromatology of Actiniæ," by C. A. MacMunn, M.A., M.D. Communicated by Prof. M. Foster, Sec.R.S.

The conclusions arrived at may in part be summed up as follows.—

(1) *Actinia mesembryanthemum* contains a colouring matter which can be changed into *hæmochromogen* and *hæmatoporphyrin*;

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